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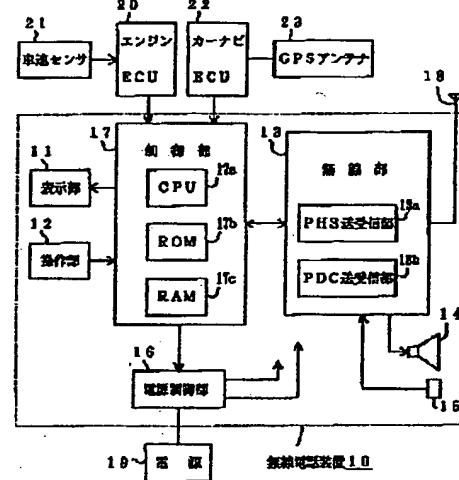
(54) ON-VEHICLE RADIO TELEPHONE SYSTEM

is not supplied to the transmission reception sections 13a, 13b.

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a radio telephone system that is of on-vehicle mount with low power consumption and that is automatically capable of setting to a cellular model or a cordless model.

SOLUTION: This on-vehicle radio telephone system 10 is provided with a radio section 13 and a control section 17. The control section 17 detects a current position received from a car navigation system ECU 22. When the current position is within a PHS area, the control section 17 detects a vehicle speed received from an engine ECU 20 and supplies power only to a PHS transmission reception section 13a to select transmission reception by the PHS transmission reception section 13a, when the vehicle speed is low. On the other hand, when the current position is located at the outside of the PHS area or the vehicle speed is high, and when the current position is within a personal digital cellular PDC area, the control section 17 supplies power only to a PDC transmission reception section 13b to allow the PDC transmission reception section 13b to make transmission reception, and when the current position is at the outside of the PDC, power



CLAIMS

[Claim(s)]

[Claim 1] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, It changes so that it may transmit and receive with a cordless mold radiotelephone, if the vehicle speed is judged to be under a predetermined rate by said vehicle speed decision means. The radio telephone equipment for mount characterized by having the vehicle speed flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone, if the vehicle speed is judged to be more than a predetermined rate.

[Claim 2] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that it may transmit and receive with a cordless mold radiotelephone, if it is judged that the current position belongs to said usable area with said area decision means. The radio telephone equipment for mount characterized by having the area flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone, if the current position is judged not to belong to said usable area.

[Claim 3] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that the current position may transmit [the vehicle speed is judged to be a low speed by said vehicle speed decision means, and] and receive with a cordless mold radiotelephone in said usable area with said area decision means, a group then when it is judged. The radio telephone equipment for mount characterized by having the change control means which the vehicle speed is not a low speed, or is changed so that it may transmit and receive with a cellular mold radiotelephone, when the current position does not belong to said usable area.

[Claim 4] It is the radio telephone equipment for mount characterized by being a radio telephone

equipment for mount according to claim 3, and said change control means supplying power to neither a cordless mold radiotelephone nor a cellular mold radiotelephone when the current position moreover does not belong to the usable area of a cellular mold radiotelephone by the case where the vehicle speed is not a low speed or the current position does not belong to said usable area.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone represented by PHS (Personal Handyphone System, Personal Handyphone System) and the cellular mold radiotelephone represented by PDC (Personal Digital Cellular and personal digital - cellular), such as a cellular phone.

[0002]

[Description of the Prior Art] What was indicated by JP,9-163450,A is known as a radio telephone equipment equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. This radio telephone equipment is constituted [both] so that either of PHS which is PDC and the cordless mold which are a cellular mold can operate a wireless receive section, the wireless transmitting section, and a control section, when it can communicate with PHS, it registers with that base station, and when it cannot communicate with PHS, it controls by the control section to register to a PDC base station. If the registration to a base station is always tried with PHS, the registration is successful and the registration will not specifically be [it will consider as the waiting receptacle condition for reception with PHS and] successful, it considers as the waiting receptacle condition for reception in PDC.

[0003] If phonecall charges and power consumption could be saved since according to this radio telephone equipment phonecall charges were cheap when it was able to talk over the telephone with PHS, it operated as PHS with small power consumption, and it was set automatically by PDC only when a message with PHS was impossible, and it goes into the area which can moreover talk PDC over the telephone, it can talk over the telephone also on a high-speed mobile anywhere again, and reception also becomes always possible.

[0004]

[Problem(s) to be Solved by the Invention] However, in the radio telephone equipment of JP,9-163450,A, the registration to a base station is always tried with PHS, and in order for PHS to determine whether the waiting receptacle for reception is carried out, or the waiting receptacle for reception is carried out by PDC, even when the waiting receptacle for reception is being carried out

by PDC, it is necessary to supply power to PHS continuously by whether the registration is successful or it does not carry out. That is, when the waiting receptacle for reception was being carried out by PDC, PHS will also consume power and had [irrespective of] the problem that sufficient power-saving effectiveness was not acquired.

[0005] This invention is made in view of the above-mentioned technical problem, and it is an object for car loading and aims at offering the radio telephone equipment which can set automatically in a cellular mold or a cordless mold with low power.

[0006]

[The means for solving a technical problem and an effect of the invention] In order to solve the above-mentioned technical problem, invention according to claim 1 In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, It changes so that it may transmit and receive with a cordless mold radiotelephone, if the vehicle speed is judged to be under a predetermined rate by said vehicle speed decision means. If the vehicle speed is judged to be more than a predetermined rate, it will be characterized by having the vehicle speed flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone.

[0007] In this radio telephone equipment for mount, a vehicle speed decision means measures the vehicle speed and the predetermined rate which were detected by the vehicle speed detection means, and judges whether this vehicle speed is a low speed. Moreover, a vehicle speed flattery change means has cheap phonecall charges, if the vehicle speed is a low speed, and it changes so that it may transmit and receive with a cordless mold radiotelephone with small power consumption, and if the vehicle speed is not a low speed, not the cordless mold radiotelephone that cannot talk over the telephone by the high-speed mobile but phonecall charges and power consumption are comparatively high (if high-speed [get blocked and]), but it will be changed so that it may transmit and receive with the cellular mold radiotelephone which can talk over the telephone by the high-speed mobile. In addition, although a vehicle speed decision means measures the vehicle speed and a predetermined rate and it judges whether it is a low speed, the predetermined rate in that case is suitably set up in consideration of the rate region which can talk cordless mold telephone over the telephone.

[0008] According to this radio telephone equipment for mount, compared with the case where only a cellular mold is used, phonecall charges and power consumption can be low stopped by considering as a cordless mold, when a low speed [the vehicle speed], and changing to a cellular mold, only when the vehicle speed is a high speed. Moreover, in order for there to be nothing then and to change a cordless mold or a cellular mold according to the vehicle speed according to the information

acquired through a radiotelephone, When supplying power to the cordless mold, the electric power supply to a cellular mold is stopped. Conversely, when supplying power to the cellular mold, the electric power supply to a cordless mold can be stopped, and compared with the case where power is continuously supplied to a cordless mold like the radio telephone equipment of JP,9-163450,A, power consumption can be stopped low.

[0009] Moreover, invention according to claim 2 is set to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that it may transmit and receive with a cordless mold radiotelephone, if it is judged that the current position belongs to said usable area with said area decision means. If the current position is judged not to belong to said usable area, it will be characterized by having the area flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone.

[0010] In this radio telephone equipment for mount, an area decision means judges whether the current position detected by the location detection means belongs to the usable area of a cordless mold radiotelephone. moreover, as for an area flattery change means, the current position belongs to said usable area -- if it becomes, phonecall charges are cheap, and it changes so that it may transmit and receive with a cordless mold radiotelephone with small power consumption, and the current position does not belong to said usable area -- if it becomes, although phonecall charges and power consumption are comparatively high, it will change so that usable area may transmit and receive with a large cellular mold radiotelephone.

[0011] According to this radio telephone equipment for mount, compared with the case where only a cellular mold is used, phonecall charges and power consumption can be low stopped by considering as a cordless mold, when the current position is in the usable area of a cordless mold radiotelephone, and changing to a cellular mold, only when it separates from this usable area. Moreover, in order for there to be nothing then and to change a cordless mold or a cellular mold according to the current position according to the information acquired through a radiotelephone, When supplying power to the cordless mold, the electric power supply to a cellular mold is stopped. Conversely, when supplying power to the cellular mold, the electric power supply to a cordless mold can be stopped, and compared with the case where power is continuously supplied to a cordless mold like the radio telephone equipment of JP,9-163450,A, power consumption can be stopped low.

[0012] Furthermore, invention according to claim 3 is set to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. Said vehicle speed detection means, said vehicle speed decision means, said location detection means, and said area decision means, It changes so that the current position may transmit [the

vehicle speed is judged to be a low speed by said vehicle speed decision means, and] and receive with a cordless mold radiotelephone in said usable area with said area decision means, a group then when it is judged. It is characterized by having the change control means which the vehicle speed is not a low speed, or is changed so that it may transmit and receive with a cellular mold radiotelephone, when the current position does not belong to said usable area.

[0013] In this radio telephone equipment for mount, the vehicle speed is a low speed, and when the current position belongs to the usable area of a cordless mold radiotelephone, a change control means is changed so that it may transmit and receive with a cordless mold radiotelephone, and or the vehicle speed is not a low speed, when the current position does not belong to the usable area of a cordless mold radiotelephone, it is changed so that it may transmit and receive with a cellular mold radiotelephone. That is, since a cordless mold cannot be used if the current position becomes the usable area of a cordless mold radiotelephone outside even if the vehicle speed is a low speed, and a cordless mold cannot be used if the vehicle speed is high-speed even if the current position is in the usable area of a cordless mold radiotelephone, in such a case, it changes at a cellular mold. According to this radio telephone equipment for mount, the same effectiveness as claims 1 and 2 is acquired effectively.

[0014] In the radio telephone equipment for mount of this claim 3, as indicated to claim 4, the vehicle speed is not a low speed, or when the current position moreover does not belong to the usable area of a cellular mold radiotelephone, said change control means may consist of cases where the current position does not belong to said usable area so that power may be supplied to neither a cordless mold radiotelephone nor a cellular mold radiotelephone. In this case, since it consumes power with neither of the radiotelephones in being unusable, power consumption can be stopped further.

[0015]

[Embodiment of the Invention] Below, the suitable operation gestalt of this invention is explained based on a drawing. Drawing 1 is a block diagram showing the whole radio-telephone-equipment configuration for mount of the operation gestalt to which this invention was applied.

[0016] The radio telephone equipment 10 for mount may be deferred by the car like a land mobile radiotelephone, or is carried like a general cellular phone. The displays 11, such as LCD for this radio telephone equipment 10 for mount to display the message transmitted from other telephone equipments, actuation guidance / actuation situation of this telephone equipment 10, etc., The control unit 12 equipped with the key switch group for performing a dial input, directions of message initiation and termination, Cana, an alphabetic-character input, etc., The wireless section 13 transmit and receive voice by the well-known modulation technique through the antenna 18 for performing radio between the base stations which are not illustrated, The loudspeaker 14 for outputting a partner's voice at the time of a message, and the microphone 15 for inputting one's voice at the time

of a message, It has the power control section 16 for controlling the electric power supply from a power supply section 19 to each part of the radio telephone equipment 10 for mount, and the control section 17 which consists of a microcomputer which consisted of well-known CPU17a, ROM17b, RAM17c, etc.

[0017] An engine ECU 20 and car navigation (henceforth car navigation ECU) ECU 22 are connected to the control section 17 as an external instrument. Although an engine ECU 20 performs various kinds of processings required for engine control, with this operation gestalt, the role which outputs the input signal from the speed sensor 21 which detects the vehicle speed to a control section 17 is played. Moreover, although processing which displays the current position on the map is performed while car navigation ECU 22 displays a map on the display screens, such as LCD of the mount which is not illustrated, with this operation gestalt, the role which outputs the current position for which received the electric wave of a satellite from the GPS antenna 23, and it asked using the principle of triangulation to a control section 17 is played.

[0018] A loudspeaker 14 and a microphone 15 are connected to the wireless section 13, and PDC transceiver section 13b for functioning as PDC which is PHS transceiver section 13a for functioning as PHS which is a cordless mold radiotelephone, and a cellular mold radiotelephone is prepared according to the individual, respectively. PHS transceiver section 13a and PDC transceiver section 13b output as voice the received wave from the base station which transmitted the voice inputted into the microphone 15 to the base station through the antenna 18, and was received with the antenna 18 from a loudspeaker 14 like well-known PDC and PHS, respectively.

[0019] That is, if PHS transceiver section 13a of the wireless section 13 will be in the base station of PHS, and the condition which can be transmitted and received through an antenna 18 if power is supplied from the power control section 16, and an antenna 18 receives the received wave from a base station, after it will change this into the signal of an intermediate frequency band and will change it into baseband signaling further, it is changed into an analog signal through predetermined processing, and is outputted as voice from a loudspeaker 14. Moreover, after changing into a digital signal the analog signal inputted into the microphone 15, it considers as baseband signaling by the transmit timing defined by the time-sharing-control circuit which is not illustrated, this baseband signaling is modulated, and it changes into the signal (1.9GHz band) which has the radio frequency of a cordless method, and transmits to a base station from an antenna 18.

[0020] Moreover, if PDC transceiver section 13b of the wireless section 13 will be in the base station of PDC, and the condition which can be transmitted and received through an antenna 18 if power is supplied from the power control section 16, and an antenna 18 receives the received wave from a base station, after it will change this into the signal of an intermediate frequency band and will change it into baseband signaling further, it is outputted as voice from a loudspeaker 14 after changing into an analog signal through predetermined processing. Moreover, after changing into a

digital signal the analog signal inputted into the microphone 15, it becomes irregular by the transmit timing defined by the time-sharing-control circuit which is not illustrated, and this is transmitted to a base station from an antenna 18.

[0021] Next, processing of the control section 17 of the radio telephone equipment 10 for mount of the above-mentioned configuration is explained. Although CPU17a of a control section 17 performs various kinds of programs memorized by ROM17b, it explains the mode-of-operation change processing performed by every predetermined time (for example, several ms) here. Drawing 2 is the flow chart of this mode-of-operation change processing.

[0022] If this processing is started, CPU17a of a control section 17 will detect first the current position inputted from car navigation ECU 22 in step (it is called Following S) 110. In addition, car navigation ECU 22 may ask for the current position of a car using the electric wave sent not only from GPS but from a beacon etc., and may ask for the current position of a car from a bearing sensor and a speed sensor (or wheel speed sensor).

[0023] In S120 continuing, as for CPU17a of a control section 17, the current position judges whether it is the inside of PHS area. With this operation gestalt, PHS area information (information which shows whether PHS is usable in which area) is beforehand memorized by ROM17b of a control section 17. CPU17a tests the current position and this PHS area information by comparison. If the current position is outside PHS area (it is NO at S120), it will progress to S160 later mentioned since the message with PHS is impossible. The vehicle speed detected with the speed sensor 21 through the engine ECU 20 on the other hand by S130 continuing when the current position was in PHS area (it is YES at S120) is inputted. Furthermore, the predetermined rate (numeric value defined within the limits of 10 - 20 km/h as a rate to which PHS can telephone with this operation gestalt) beforehand memorized by this vehicle speed and ROM17b by S140 continuing is measured. And if the vehicle speed of a low speed, i.e., the vehicle speed, is smaller than a predetermined rate (it is YES at S140), power will be supplied only to PHS transceiver section 13a of the wireless section 13 through the power control section 16 by S150 continuing, and it will change so that it may transmit and receive in PHS transceiver section 13a, and this processing will be finished. On the other hand, if a high speed, i.e., the vehicle speed, becomes more than a predetermined rate (it is NO at S140), since the message with PHS is impossible, the vehicle speed will progress to S160.

[0024] In S160, as for CPU17a of a control section 17, the current position judges whether it is the inside of PDC area. With this operation gestalt, PDC area information (information which shows whether PDC is usable in which area) is beforehand memorized by ROM17b of a control section 17. CPU17a tests the current position and this PDC area information by comparison, it changes them so that power may be supplied only to PDC transceiver section 13b of the wireless section 13 through the power control section 16 by S170 continuing and it may transmit and receive in PDC transceiver section 13b, if the current position is in PDC area (it is YES at S160), and it finishes this processing.

On the other hand, if the current position is outside PDC area (it is NO at S160), since PHS or PDC cannot talk over the telephone, either, power will be supplied through the power control section 16 to neither PHS transceiver section 13a nor PDC transceiver section 13b by S180 continuing, but this processing will be finished.

[0025] As mentioned above, according to this radio telephone equipment 10 for mount, in PHS area, if the vehicle speed is a low speed, the current position Change so that phonecall charges and power consumption may transmit and receive in comparatively low PHS transceiver section 13a, and if the outside of PHS area or the vehicle speed has the high-speed current position Since it changes so that it may transmit and receive in PDC transceiver section 13b which can talk over the telephone by the high-speed mobile although phonecall charges and power consumption are comparatively high, compared with the case where only PDC transceiver section 13b is used, phonecall charges and power consumption can be stopped low.

[0026] Moreover, this radio telephone equipment 10 for mount does not change a mode of operation according to the information acquired through the wireless section 13. In order to change a mode of operation according to the current position and the vehicle speed which are inputted from an external instrument (an engine ECU 20 and car navigation ECU 22), What is necessary is just to stop the electric power supply to both transceiver sections 13a and 13b moreover, that what is necessary is to supply power to either PHS transceiver section 13a or PDC transceiver section 13b, when the current position has separated from any area of PHS and PDC. For this reason, power consumption can be stopped low.

[0027] Here, when the component of this operation gestalt and this invention is contrasted, the speed sensor 21 and Engine ECU 20 of this operation gestalt are equivalent to the vehicle speed detection means of this invention, the GPS antenna 23 and car navigation ECU 22 are equivalent to the location detection means of this invention, and CPU17a of a control section 17 is equivalent to a vehicle speed decision means, a vehicle speed flattery change control means, an area decision means, an area flattery change control means, and a change control means.

[0028] In addition, as long as the gestalt of operation of this invention is not limited to the above-mentioned operation gestalt at all and belongs to the technical range of this invention, it cannot be overemphasized that various gestalten can be taken. For example, conventionally, although the satellite PDC in which a wireless message is possible is known through the earth station PDC and satellite in which a wireless message is possible through the earth station, which method of these may be used for PDC as PDC transceiver section 13b of the above-mentioned operation gestalt. Moreover, the wireless section 13 may consist of the PHS transceiver section, the earth station PDC transceiver section, and the satellite PDC transceiver section. When it is judged at this time that NO, i.e., the vehicle speed, is not a low speed in the case where NO, i.e., the current position, is judged to be the outside of PHS area by S120 in the flow chart of drawing 2 , or S140, as shown in drawing 3 ,

the current position judges whether it is earth station PDC area (S210), if it is in earth station PDC area (it is YES at S210), power will be supplied only to the earth station PDC transceiver section (S220), and this processing will be finished. On the other hand, if it is outside earth station PDC area (it is NO at S210), the current position will judge whether it is the inside of satellite PDC area (S230), if it is in satellite PDC area (it is YES at S230), power will be supplied only to the satellite PDC transceiver section (S240), and this processing will be finished. On the other hand, if the current position is outside satellite PDC area in S230 (it is NO at S230), this processing will be finished, supplying power to neither of the transceiver sections (S250). In addition, phonecall charges become high in order of the PHS transceiver section, the earth station PDC transceiver section, and the satellite PDC transceiver section, and the area which can be talked over the telephone becomes large at this order. According to this mode-of-operation change processing, the same effectiveness as the above-mentioned operation gestalt is acquired.

[0029] Moreover, although PHS area information and PDC area information used what was memorized by ROM17b of a control section 17, an external instrument like CD-ROM drive equipment is connected to a control section 17 through an external connection terminal, and you may make it read such area information from a record medium like CD-ROM with which area information was recorded through this external instrument with the above-mentioned operation gestalt. Or I have area information transmitted from a base information center via the Internet etc., or you may make it collect information according to a demand.

[0030] Furthermore, although PHS transceiver section 13a and PDC transceiver section 13b were considered as the respectively independent configuration, you may constitute from an above-mentioned operation gestalt in the circuit to share and the circuit used only by one side like the complex-terminal machine for mobile communication indicated by [Embodiment of the Invention] and drawing 1 of JP,9-163450,A. In this case, in changing so that it may transmit and receive in PHS transceiver section 13a, power is supplied to the circuit to share and the circuit used only with PHS, and it does not supply power to the circuit used only by PDC. On the contrary, in changing so that it may transmit and receive in PDC transceiver section 13b, power is supplied to the circuit to share and the circuit used only by PDC, and it does not supply power to the circuit used only with PHS.

[0031] Furthermore, if it will progress to S150 and power will be supplied only to PHS transceiver section 13a in the flow chart of drawing 2 again, if the current position is judged to be the inside of PHS area by S120 (it is YES at S120), and the current position is judged to be the outside of PHS area by S120 (it is NO at S120), it may progress to S170 and power may be supplied only to PDC transceiver section 13b. Or if it will progress to S150 and power will be supplied only to PHS transceiver section 13a, if it progresses to S130 immediately, the vehicle speed is detected after processing initiation and it is judged as a low speed by S140 (it is YES at S140), and it is judged by

S140 that it is high-speed (it is NO at S140), it may progress to S170 and power may be supplied only to PDC transceiver section 13b.

[0032] In addition, as a cellular mold radiotelephone explained above, you may be which communication modes, such as a TDMA method and a CDMA method. Moreover, if the PHS transceiver section and the PDC transceiver section as the wireless section are prepared in a cradle and the PHS transceiver section is prepared in a hand set when a hand set and a cradle are divided and are constituted as non-portable telephone equipment for mount, the hand kit of radio system can be constituted using the transceiver ability of PHS. Moreover, if the power antenna is installed in the vehicle, it will become possible to perform the communication link by PHS to fitness more.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the whole radio-telephone-equipment configuration for mount of this operation gestalt.

[Drawing 2] It is the flow chart of the mode-of-operation change processing which the control section of the radio telephone equipment for mount of this operation gestalt performs.

[Drawing 3] It is the flow chart of the mode-of-operation change processing which the control section of the radio telephone equipment for mount of another operation gestalt performs.

[Description of Notations]

10 [... The wireless section, the 13 a...PHS transceiver section, the 13 b...PDC transceiver section, 14 / ... A loudspeaker, 15 / ... A microphone, 16 / ... The power control section, 17 / ... A control section, 18 / ... An antenna, 19 / ... A power supply section, 20 / ... Engine ECU, 21 / ... A speed sensor, 22 / ... Car navigation ECU, 23 / ... GPS antenna] ... The radio telephone equipment for mount, 11 ... A display, 12 ... A control unit, 13

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1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. **** shows the word which can not be translated.

3. In the drawings, any words are not translated.

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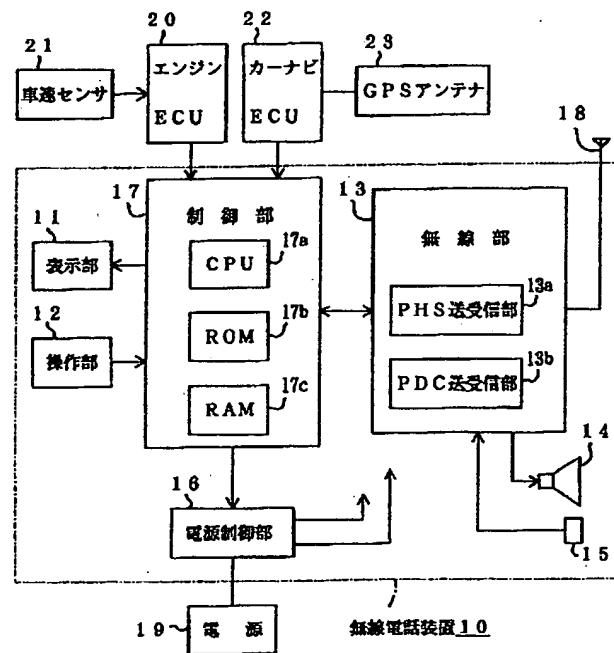
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(54) 【発明の名称】 車載用無線電話装置

(57) 【要約】

【課題】 車両搭載用であって、低電力でセルラー型とコードレス型のいずれかに自動設定可能な無線電話装置を提供する。

【解決手段】 車載用無線電話装置10は、無線部13と制御部17とを備えている。制御部17は、カーナビECU22から入力される現在位置を検出し、その現在位置がPHSエリア内ならば、エンジンECU20から入力される車速を検出し、車速が低速ならば、PHS送受信部13aにのみ電力を供給し、PHS送受信部13aにて送受信するよう切り替える。一方、現在位置がPHSエリア外か車速が高速の場合には、現在位置がPDCエリア内であればPDC送受信部13bにのみ電力を供給し、PDC送受信部13bにて送受信するよう切り替えるが、現在位置がPDCエリア外ならば送受信部13a、13bには電力を供給しない。



【特許請求の範囲】

【請求項1】 コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段と、前記車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する車速判断手段と、前記車速判断手段により車速が所定速度未満と判断されたならばコードレス型無線電話機にて送受信するように切り替え、車速が所定速度以上と判断されたならばセルラー型無線電話機にて送受信するように切り替える車速追従切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項2】 コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、現在位置を検出する位置検出手段と、前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断されたならばコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属さないと判断されたならばセルラー型無線電話機にて送受信するように切り替えるエリア追従切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項3】 コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段と、前記車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する車速判断手段と、

現在位置を検出する位置検出手段と、

前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、

前記車速判断手段により車速が低速と判断され且つ前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断された場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合にはセルラー型無線電話機にて送受信するように切り替える切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項4】 請求項3記載の車載用無線電話装置であつて、

前記切替制御手段は、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合で、しかも現在位置がセルラー型無線電話機の使用可能エリアに属さない場合にはコードレス型無線電話機にて送受信するように切り替える切替制御手段とを備えたことを特徴とする車載用無線電話装置。

話機のいずれにも電力を供給しないことを特徴とする車載用無線電話装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、P H S (Personal Handyphone System、パーソナル・ハンディホン・システム) に代表されるコードレス型無線電話機と、携帯電話などのP D C (Personal Digital Cellular、パーソナル・デジタル・セルラー) に代表されるセルラー型無線電話機の両方を備えた車載用無線電話装置に関する。

【0002】

【従来の技術】 コードレス型無線電話機とセルラー型無線電話機の両方を備えた無線電話装置としては、特開平9-163450号公報に開示されたものが知られている。この無線電話装置は、無線受信部、無線送信部、制御部とともにセルラー型であるP D C、コードレス型であるP H S のいずれでも動作できるように構成され、P H S で通信可能なときはその基地局に登録し、P H S で通信不可能なときはP D C 基地局へ登録するよう、制御部で制御するものである。具体的には、常時P H S で基地局への登録を試み、その登録が成功すればP H S にて受信待ち受け状態とし、その登録が成功しなければP D C にて受信待ち受け状態とする。

【0003】 この無線電話装置によれば、P H S で通話可能なときは通話料が安価で消費電力が小さなP H S として動作し、P H S で通話不能なときだけP D C に自動設定されるから、通話料や消費電力が節約でき、しかもP D C の通話可能なエリアに入つていれば、どこでも、又高速移動体上でも通話でき、受信も常に可能になる。

【0004】

【発明が解決しようとする課題】 しかしながら、特開平9-163450号公報の無線電話装置では、常時P H S で基地局への登録を試み、その登録が成功するかしないかによって、P H S で受信待ち受けするかP D C で受信待ち受けするかを決定するため、P D C で受信待ち受けしている場合でも、P H S に絶えず電力を供給している必要がある。つまり、P D C で受信待ち受けしている場合にもかかわらず、P H S も電力を消費することとなり、十分な節電効果が得られないという問題があった。

【0005】 本発明は上記課題に鑑みなされたものであり、車両搭載用であつて、低電力でセルラー型とコードレス型のいずれかに自動設定可能な無線電話装置を提供することを目的とする。

【0006】

【課題を解決するための手段及び発明の効果】 上記課題を解決するため、請求項1記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段

度とを比較して該車速が低速であるか否かを判断する車速判断手段と、前記車速判断手段により車速が所定速度未満と判断されたならばコードレス型無線電話機にて送受信するように切り替え、車速が所定速度以上と判断されたならばセルラー型無線電話機にて送受信するように切り替える車速追従切替制御手段とを備えたことを特徴とする。

【0007】この車載用無線電話装置では、車速判断手段は、車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する。また、車速追従切替手段は、車速が低速ならば、通話料が安価で消費電力が小さいコードレス型無線電話機にて送受信するように切り替え、車速が低速でなければ（つまり高速ならば）、高速移動体で通話不可能なコードレス型無線電話機ではなく、通話料や消費電力が比較的高いが高速移動体で通話可能なセルラー型無線電話機にて送受信するように切り替える。なお、車速判断手段は車速と所定速度とを比較して低速か否かを判断するが、その際の所定速度はコードレス型電話機の通話可能な速度域を考慮して適宜設定される。

【0008】この車載用無線電話装置によれば、車速が低速な場合はコードレス型とし、車速が高速の場合にのみセルラー型に切り替えることにより、セルラー型のみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。また、無線電話機を通じて得られる情報に応じてではなく、車速に応じてコードレス型かセルラー型かを切り替えるため、コードレス型へ電力を供給しているときはセルラー型への電力供給を停止し、逆にセルラー型へ電力を供給しているときはコードレス型への電力供給を停止でき、特開平9-163450号公報の無線電話装置のように絶えずコードレス型へ電力を供給する場合に比べて、消費電力を低く抑えることができる。

【0009】また、請求項2記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、現在位置を検出する位置検出手段と、前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断されたならばコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属しないと判断されたならばセルラー型無線電話機にて送受信するように切り替えるエリア追従切替制御手段とを備えたことを特徴とする。

【0010】この車載用無線電話装置では、エリア判断手段は、位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断する。また、エリア追従切替手段は、現在位置が前記使用可能エリアに属するか否かを判断する。

費電力が小さいコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属しないならば、通話料や消費電力が比較的高いが使用可能エリアが広いセルラー型無線電話機にて送受信するように切り替える。

【0011】この車載用無線電話装置によれば、現在位置がコードレス型無線電話機の使用可能エリア内の場合にはコードレス型とし、この使用可能エリアから外れた場合にのみセルラー型に切り替えることにより、セルラー型のみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。また、無線電話機を通じて得られる情報に応じてではなく、現在位置に応じてコードレス型かセルラー型かを切り替えるため、コードレス型へ電力を供給しているときはセルラー型への電力供給を停止し、逆にセルラー型へ電力を供給しているときはコードレス型への電力供給を停止でき、特開平9-163450号公報の無線電話装置のように絶えずコードレス型へ電力を供給する場合に比べて、消費電力を低く抑えることができる。

【0012】更に、請求項3記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、前記車速検出手段と、前記車速判断手段と、前記位置検出手段と、前記エリア判断手段と、前記車速判断手段により車速が低速と判断され且つ前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断された場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でないか又は現在位置が前記使用可能エリアに属しない場合にはセルラー型無線電話機にて送受信するように切り替える切替制御手段とを備えたことを特徴とする。

【0013】この車載用無線電話装置では、切替制御手段は、車速が低速で且つ現在位置がコードレス型無線電話機の使用可能エリアに属する場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でない又は現在位置がコードレス型無線電話機の使用可能エリアに属しない場合にはセルラー型無線電話機にて送受信するように切り替える。つまり、車速が低速であっても現在位置がコードレス型無線電話機の使用可能エリア外ならばコードレス型は使用できず、また、現在位置がコードレス型無線電話機の使用可能エリア内であっても車速が高速ならばコードレス型は使用できないため、このような場合にはセルラー型に切り替えるのである。この車載用無線電話装置によれば、請求項1、2と同様の効果が有効に得られる。

【0014】この請求項3の車載用無線電話装置においては、請求項4に記載したように、前記切替制御手段は、車速が低速でないか又は現在位置が前記使用可能エリアに属しない場合で、しかも現在位置がセルラー型無線電話機の使用可能エリアに属しない場合には、コードレス型無線電話機にて送受信するように切り替える。

電力を供給しないように構成してもよい。この場合、いずれの無線電話機でも使用不可能な場合には、電力を消費することができないため、一層消費電力を抑えることができる。

【0015】

【発明の実施の形態】以下に、本発明の好適な実施形態を図面に基づいて説明する。図1は、本発明が適用された実施形態の車載用無線電話装置の全体構成を表わすブロック図である。

【0016】車載用無線電話装置10は、自動車電話のように車両に据え置きされたものであってもよいし、あるいは、一般的な携帯電話のように携帯可能なものであってもよい。この車載用無線電話装置10は、他の電話装置から送信されてきたメッセージやこの電話装置10の操作案内・動作状況等を表示するためのLCDなどの表示部11と、ダイヤル入力や通話開始・終了の指示やカナ・英数字入力などを行うためのキースイッチ群を備えた操作部12と、図示しない基地局との間で無線通信を行うためのアンテナ18を介して周知の変調方式によって音声を送受信する無線部13と、通話時に相手の音声を出力するためのスピーカ14と、通話時に自分の音声を入力するためのマイク15と、電源部19から車載用無線電話装置10の各部への電力供給を制御するための電源制御部16と、周知のCPU17a、ROM17b、RAM17cなどで構成されたマイコンからなる制御部17とを備えている。

【0017】制御部17には、外部機器としてエンジンECU20とカーナビゲーションECU(以下カーナビECUともいう)22が接続されている。エンジンECU20は、エンジン制御に必要な各種の処理を実行するものであるが、本実施形態では車速を検出する車速センサ21からの入力信号を制御部17へ出力する役割を果たす。また、カーナビECU22は、図示しない車載のLCDなどの表示画面に地図を表示すると共にその地図上に現在位置を表示する処理を実行するものであるが、本実施形態ではGPSアンテナ23から人工衛星の電波を受信し三角測量の原理を利用して求めた現在位置を制御部17へ出力する役割を果たす。

【0018】無線部13には、スピーカ14とマイク15が接続され、コードレス型無線電話機であるPHSとして機能するためのPHS送受信部13aとセルラー型無線電話機であるPDCとして機能するためのPDC送受信部13bとがそれぞれ個別に設けられている。PHS送受信部13a及びPDC送受信部13bは、それ周知のPDC及びPHSと同様にして、マイク15に入力された音声をアンテナ18を介して基地局へ送信し、また、アンテナ18で受信した基地局からの受信波をスピーカ14から音声として出力する。

【0019】すなわち、無線部13のPHS送受信部13a

ナ18を介してPHSの基地局と送受信可能な状態となり、アンテナ18で基地局からの受信波を受信すると、これを中間周波数帯の信号に変換し、更にベースバンド信号に変換した後、所定の処理を経てアナログ信号に変換し、スピーカ14から音声として出力する。また、マイク15に入力されたアナログ信号をデジタル信号に変換した後、図示しない時分割制御回路により定められた送信タイミングでベースバンド信号とし、このベースバンド信号を変調し、コードレス方式の無線周波数を有する信号(1.9GHz帯)に変換し、アンテナ18から基地局へ送信する。

【0020】また、無線部13のPDC送受信部13bは、電源制御部16から電力が供給されるとアンテナ18を介してPDCの基地局と送受信可能な状態となり、アンテナ18で基地局からの受信波を受信すると、これを中間周波数帯の信号に変換し、更にベースバンド信号に変換した後、所定の処理を経てアナログ信号に変換後、スピーカ14から音声として出力する。また、マイク15に入力されたアナログ信号をデジタル信号に変換した後、図示しない時分割制御回路により定められた送信タイミングで変調し、これをアンテナ18から基地局へ送信する。

【0021】次に、上記構成の車載用無線電話装置10の制御部17の処理について説明する。制御部17のCPU17aは、ROM17bに記憶された各種のプログラムを実行するが、ここでは所定時間(例えば数ms)毎に実行される動作モード切替処理について説明する。図2はこの動作モード切替処理のフローチャートである。

【0022】この処理が開始されると、制御部17のCPU17aは、まずステップ(以下Sという)110において、カーナビECU22から入力される現在位置を検出する。なお、カーナビECU22は、GPSのみならずビーコン等から発信される電波を利用して車両の現在位置を求めてよいし、方位センサと車速センサ(又は車輪速センサ)から車両の現在位置を求めてよい。

【0023】続くS120において、制御部17のCPU17aは現在位置がPHSエリア内か否かを判断する。本実施形態では、制御部17のROM17bには、40 予めPHSエリア情報(どのエリアでPHSが使用可能かを示す情報)が記憶されている。CPU17aは、現在位置とこのPHSエリア情報を照らし合わせ、現在位置がPHSエリア外であれば(S120でNO)、PHSでの通話が不可能なため後述するS160に進み、一方、現在位置がPHSエリア内であれば(S120でYES)、続くS130でエンジンECU20を介して車速センサ21で検出された車速を入力し、更に続くS140でこの車速とROM17bに予め記憶された所定速度(本実施形態ではPHSが通話可能な速度として100～200km/hの範囲内がゆるくわた新店)を比較

する。そして、車速が低速つまり車速が所定速度よりも小さければ(S140でYES)、続くS150で電源制御部16を介して無線部13のPHS送受信部13aにのみ電力を供給し、PHS送受信部13aにて送受信するように切り替えて、この処理を終える。一方、車速が高速つまり車速が所定速度以上ならば(S140でNO)、PHSでの通話が不可能なため、S160に進む。

【0024】S160において、制御部17のCPU17aは、現在位置がPDCエリア内か否かを判断する。本実施形態では、制御部17のROM17bには予めPDCエリア情報(どのエリアでPDCが使用可能かを示す情報)が記憶されている。CPU17aは、現在位置とこのPDCエリア情報を照らし合わせ、現在位置がPDCエリア内であれば(S160でYES)、続くS170で電源制御部16を介して無線部13のPDC送受信部13bにのみ電力を供給し、PDC送受信部13bにて送受信するように切り替えて、この処理を終える。一方、現在位置がPDCエリア外であれば(S160でNO)、PHSでもPDCでも通話が不可能であるため、続くS180で電源制御部16を介してPHS送受信部13aとPDC送受信部13bのいずれにも電力を供給せず、この処理を終える。

【0025】以上のように、この車載用無線電話装置10によれば、現在位置がPHSエリア内で車速が低速ならば、通話料や消費電力が比較的低いPHS送受信部13aにて送受信するように切り替え、現在位置がPHSエリア外か車速が高速ならば、通話料や消費電力が比較的高いが高速移動体で通話可能なPDC送受信部13bにて送受信するように切り替えるため、PDC送受信部13bのみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。

【0026】また、この車載用無線電話装置10は、無線部13を通じて得られる情報に応じて動作モードを切り替えるのではなく、外部機器(エンジンECU20やカーナビECU22)から入力される現在位置や車速に応じて動作モードを切り替えるため、PHS送受信部13a又はPDC送受信部13bのいずれか一方にのみ電力を供給すればよく、しかも、現在位置がPHS、PDCのいずれのエリアからも外れている場合には両方の送受信部13a、13bへの電力供給を停止すればよい。このため、消費電力を低く抑えることができる。

【0027】ここで、本実施形態と本発明との構成要素を対比すると、本実施形態の車速センサ21及びエンジンECU20が本発明の車速検出手段に相当し、GPSアンテナ23及びカーナビECU22が本発明の位置検出手段に相当し、制御部17のCPU17aが車速判断手段、車速追従切替制御手段、エリア判断手段、エリア追従切替制御手段、切替制御手段に相当する。

【0028】尚、本発明の実施の形態は、トヨタ車の実施の形態

に何ら限定されるものではなく、本発明の技術的範囲に属する限り種々の形態を探り得ることはいうまでもない。例えば、従来よりPDCは、地上局を介して無線通話可能な地上局PDCと、衛星を介して無線通話可能な衛星PDCとが知られているが、上記実施形態のPDC送受信部13bとしては、このうちのどちらの方式を採用してもよい。また、無線部13を、PHS送受信部と地上局PDC送受信部と衛星PDC送受信部とで構成してもよい。このとき、図2のフローチャートにおけるS120でNOつまり現在位置がPHSエリア外と判断された場合やS140でNOつまり車速が低速でないと判断された場合、図3に示すように、現在位置が地上局PDCエリアか否かを判断し(S210)、地上局PDCエリア内であれば(S210でYES)、地上局PDC送受信部にのみ電力を供給し(S220)、この処理を終える。一方、地上局PDCエリア外であれば(S210でNO)、現在位置が衛星PDCエリア内か否かを判断し(S230)、衛星PDCエリア内であれば(S230でYES)、衛星PDC送受信部にのみ電力を供給し(S240)、この処理を終える。一方、S230で現在位置が衛星PDCエリア外であれば(S230でNO)、いずれの送受信部にも電力を供給しないまま(S250)、この処理を終える。なお、通話料はPHS送受信部、地上局PDC送受信部、衛星PDC送受信部の順に高くなり、通話可能エリアはこの順に広くなる。この動作モード切替処理によれば、上記実施形態と同様の効果が得られる。

【0029】また、上記実施形態では、PHSエリア情報やPDCエリア情報は制御部17のROM17bに記憶されたものを用いたが、制御部17に外部接続端子を介してCD-ROMドライブ装置のような外部機器を接続し、この外部機器を介してエリア情報が記録されたCD-ROMのような記録媒体からこれらのエリア情報を読み込むようにしてもよい。あるいは、インターネット経由等で基地情報センターからエリア情報を送信してもらうか、もしくは要求に応じて情報を収集するようにしてもよい。

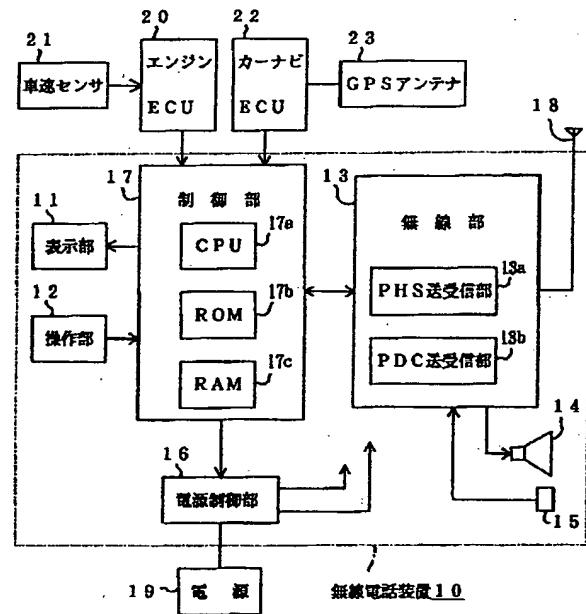
【0030】更に、上記実施形態では、PHS送受信部13aとPDC送受信部13bをそれぞれ独立の構成としたが、特開平9-163450の【発明の実施の形態】及び図1に記載された移動通信用複合端末機のように、共用する回路と一方のみで使用する回路とで構成してもよい。この場合、PHS送受信部13aにて送受信するように切り替える場合には、共用する回路とPHSでのみ使用する回路に電力を供給し、PDCでのみ使用する回路には電力を供給しない。逆に、PDC送受信部13bにて送受信するように切り替える場合には、共有する回路とPDCでのみ使用する回路に電力を供給し、PHSでのみ使用する回路には電力を供給しない。

【0031】また、図2のフローチャートに示す

S120で現在位置がPHSエリア内と判断されたならば(S120でYES)、S150へ進んでPHS送受信部13aにのみ電力を供給し、S120で現在位置がPHSエリア外と判断されたならば(S120でNO)、S170に進んでPDC送受信部13bにのみ電力を供給してもよい。あるいは、処理開始後、直ちにS130に進んで車速を検出し、S140で低速と判断されたならば(S140でYES)、S150へ進んでPHS送受信部13aにのみ電力を供給し、S140で高速と判断されたならば(S140でNO)、S170に進んでPDC送受信部13bにのみ電力を供給してもよい。

【0032】なお、上記にて説明したセルラー型無線電話機としては、T D M A 方式、C D M A 方式等いずれの通信方式であってもよい。また、車載用の据え置き型の電話装置として、ハンドセットとクレードルとが分かれ構成された場合、クレードルに無線部としてのP H S 送受信部とP D C 送受信部とを設け、ハンドセットにP H S 送受信部を設ければ、P H S のトランシーバ機能を利用して無線方式のハンドキットを構成することができ

[图 1]



る。また、車にパワーアンテナを設置しておけば、PHSによる通信をより良好に行うことが可能となる。

【図面の簡単な説明】

【図1】 本実施形態の車載用無線電話装置の全体構成を表わすブロック図である。

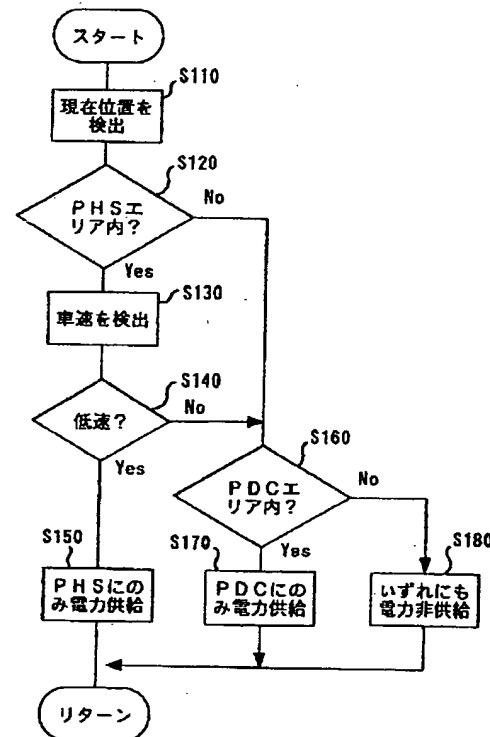
【図2】 本実施形態の車載用無線電話装置の制御部が実行する動作モード切替処理のフローチャートである。

【図3】 別の実施形態の車載用無線電話装置の制御部が実行する動作モード切替処理のフローチャートである。

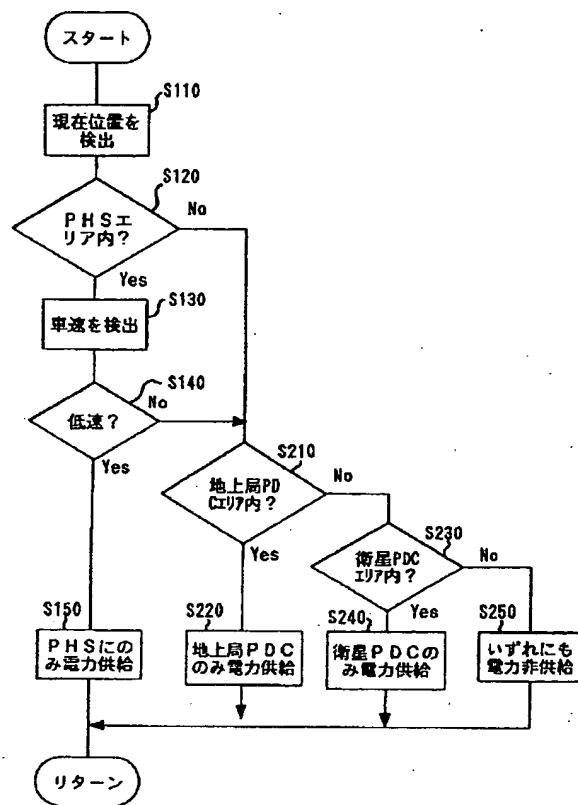
【符号の説明】

10・・・車載用無線電話装置、11・・・表示部、12・・・操作部、13・・・無線部、13a・・・PH S送受信部、13b・・・PDC送受信部、14・・・スピーカ、15・・・マイク、16・・・電源制御部、17・・・制御部、18・・・アンテナ、19・・・電源部、20・・・エンジンECU、21・・・車速センサ、22・・・カーナビECU、23・・・GPSアンテナ。

[图2]



【図3】



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